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Datasheet for the decision
of 8 September 2017

Case Number: T 0358/12 - 3.5.07

Application Number: 07811582.1

Publication Number: 2057630

IPC: G11B27/00, G11B27/28

Language of the proceedings: EN

Title of invention:
Method and apparatus for receiving, storing, and presenting
multimedia programming without indexing prior to storage

Applicant:
EchoStar Technologies L.L.C.

Headword:
Seeking in MPEG multimedia without indexing/ECHOSTAR

Relevant legal provisions:
EPC Art. 84, 123(2), 56

Keyword:
Inventive step - after amendment (yes)
Claims - clarity and support in the description - after
amendment (yes)
Amendments - added subject-matter - after amendment (no)

Decisions cited:

Catchword:

Beschwerdekammern

Boards of Appeal

Chambres de recours

European Patent Office
D-80298 MUNICH
GERMANY
Tel. +49 (0) 89 2399-0
Fax +49 (0) 89 2399-4465

Case Number: **T 0358/12 - 3.5.07**

D E C I S I O N
of Technical Board of Appeal 3.5.07
of 8 September 2017

Appellant: (Applicant)	EchoStar Technologies L.L.C. 100 Inverness Terrace East Englewood, CO 80112 (US)
Representative:	Beck Greener Fulwood House 12 Fulwood Place London WC1V 6HR (GB)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 22 September 2011 refusing European patent application No. 07811582.1 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	R. Moufang
Members:	P. San-Bento Furtado
	R. de Man

Summary of Facts and Submissions

I.   The appeal lies from the decision of the Examining
        Division to refuse European patent application
        No. 07811582.1, which was filed as international
        application PCT/US2007/018955 and published as
        WO 2008/027406, on the grounds of added subject-matter
        and lack of clarity and of inventive step in
        independent claims 1 and 7 of the set of claims filed
        at the oral proceedings. The starting point for
        inventive-step assessment was the following document:
        D1: WO 97/19552 A, published on 29 May 1997.

II.   In the statement of grounds of appeal, the appellant
        submitted a new set of claims 1 to 9 to replace the
        claims on which the contested decision was based, along
        with amended description pages.

III.   In a communication accompanying a summons to oral
        proceedings, the Board introduced the following
        document into the proceedings:
        D3: WO 2005/050999 A, published on 2 June 2005.

        With regard to the new claims, the Board reviewed the
        objections under Articles 84 and 123(2) EPC raised in
        the contested decision. It also raised new issues with
        regard to clarity, support by the description and added
        subject-matter.

        It expressed its preliminary opinion that the subject-
        matter of claim 1 was not inventive over the disclosure
        of document D1 in combination with the disclosure of
        document D3 and the common general knowledge of the
        skilled person.

IV.   With a letter of reply the appellant filed a new set of claims to replace all previous claims on file, along with amended description pages.

V.   Oral proceedings were held on 8 September 2017. During the oral proceedings the appellant replaced its request with a new request comprising claims 1 to 8 and description pages 3, 4, 4A and 4B. At the end of the oral proceedings, the chairman pronounced the Board's decision.

VI.   The appellant's final request was that the decision under appeal be set aside and that a patent be granted on the basis of the following documents:
- claims 1 to 8 of the sole request filed in the oral proceedings in appeal;
- description pages 1, 2 and 5 to 16 as published and pages 3, 4, 4A and 4B as filed in the oral proceedings in appeal;
- drawings sheets 1/6 to 6/6 as published.

VII.   Claim 1 of the sole request reads as follows:
"A method of making a special presentation of digital multimedia programming in an MPEG stream stored on a hard disk where the special presentation is a non-contiguous trick mode in which programming data is loaded from the hard disk non-contiguously, which programming had not been indexed prior to its storage, the method comprising:

    receiving (610) a seek input indicating the special presentation to be made;

    determining the read size of a portion of the stored multimedia programming and loading (660) the portion of the stored multimedia programming of determined read size into a read buffer from a starting position based on the seek input;

analyzing (680) the loaded portion of the
programming to determine if a complete intra-coded
frame of data is present; and

if a complete intra-coded frame is located,
forwarding (690) the loaded portion of the programming
for display to make (690) the special presentation;

characterised in that statistical information
including an average group of picture (GOP) size and an
average frame size is provided, and in that the method
further comprises:

calculating (630) the read size of the portion of
the stored multimedia programming to be loaded, the
read size being twice the average group of picture
(GOP) size but less than the read buffer size; and

calculating a starting read or seek position (640)
by calculating a seek vector equal to the product of
the number of frames to be skipped (610) and the
average frame size (600), adding the calculated seek
vector to the current file pointer position, and
adjusting the result by subtracting half of the average
group of picture (GOP) size."

Dependent claims 2 to 5 further define features of the
method of preceding claims.

Claim 6 reads as follows:
"A digital video recorder (100) arranged to make a
special presentation of digital multimedia programming
in an MPEG stream stored on a hard disk, where the
special presentation is a non-contiguous trick mode in
which programming data is loaded from the hard disk
non-contiguously, the recorder (100) comprising:

a hard disk (150) for storing the programming
without indexing;

processing means (160) for determining the read size
of a portion of the stored multimedia programming;

a user interface at which a seek input is received indicating the special presentation to be made;

a read buffer (220) for receiving the portion of the stored multimedia programming of determined read size, from a starting position based on the seek input; and

presentation means (130) for making the special presentation of the programming loaded into the read buffer (220) if analysis indicates that the loaded portion of the programming includes a complete intra-coded frame of data;

wherein if a complete intra-coded frame is located, the loaded portion of the programming is forwarded (680) by the processing means (160) to the presentation means (130);

characterised in that the processing means (160) receives statistical information including an average group of picture (GOP) size and an average frame size, and in that where the special presentation is to be non-contiguous, the processing means (160) is arranged to:

calculate (630) the read size of the portion of the stored multimedia programming to be loaded, the read size being twice the average group of picture (GOP) size, but less than the read buffer size; and

calculate a starting read or seek position (640) by calculating a seek vector equal to the product of the number of frames to be skipped (610) and the average frame size (600), adding the calculated seek vector to the current file pointer position, and adjusting the result by subtracting half of the average group of picture (GOP) size."

Dependent claims 7 and 8 further define features of the digital video recorder according to the preceding claim.

VIII.   The appellant's arguments relevant to this decision are
         discussed in detail below.

Reasons for the Decision

1.   The appeal complies with the provisions referred to in
         Rule 101 EPC and is therefore admissible.

2.   *Invention*

2.1   The invention concerns "special presentation" in a
         "non-contiguous trick mode" of multimedia programming
         in an MPEG (Motion Pictures Experts Group) stream
         without indexing of the multimedia programming prior to
         its storage (page 5, lines 3 to 21, and page 11,
         lines 5 to 10 of the international publication).
         Special presentation comprises reverse play, slow
         motion forward play or rewind, fast forward play or
         rewind or skip forward or back (page 17, claim 2).

2.2   The method according to the invention uses statistical
         information that can be generated during normal
         presentation (forward play). When a user invokes a
         special operation, i.e. when "a seek input" is received
         in the language of the claims, the size of the portion
         of multimedia programming to be loaded is determined on
         the basis of the statistical information (page 3,
         lines 13 to 20, page 3, line 26 to page 4, line 3,
         page 17, claim 1). If the loaded portion does not
         include a complete frame, a second portion is loaded
         (page 16, lines 3 to 5, page 18, claim 8).

2.3   As explained on page 10, lines 12 to 26, the MPEG
         standard compresses video data by representing certain
         frames as a delta from previous or subsequent frames.
         MPEG video uses pictures encoded without referencing

any other frame, called intra-coded frames (I-frames),
and pictures encoded by referencing the delta from
previous frames (predictive P-frames) and from previous
and subsequent frames (bi-predictive B-frames). The
statistical information used in the invention may
include (page 12, Table 2):

-    *avg_frm_size*: the average frame size taken over all
     frames encountered during playback;
-    *I_spacing*: the average integer number of frames
     from one I-frame to the next, also referred to as a
     group of pictures (GOP);
-    *GOP_size*: average group of pictures size,
     calculated as *I_spacing * avg_frm_size*.

2.4   The method of presentation according to the embodiment
          of Figure 6 (page 11, line 13 to page 16, line 12)
          determines in step 630 the "read size", i.e. "The size
          of stored MPEG transport stream file data to be
          read" (page 13, lines 26 and 27), and in step 640 the
          "seek position" relative to the current read position
          in the MPEG transport stream file. The current read
          position is indicated by a file pointer (page 14,
          lines 13 to 15).

          The method takes into account whether the mode is
          contiguous or not. As explained on page 11, lines 9
          and 10, a non-contiguous trick mode is any trick mode
          that loads stored data non-contiguously. The
          presentation mode is contiguous "if every frame is
          displayed (e.g., linear(play)) or if the number of
          frames to be skipped is fewer than or equal to
          (*I_spacing*)" (page 13, lines 6 to 18).

          For non-contiguous modes, the read size is twice the
          average group of pictures size. According to the
          description on page 14, lines 2 to 6, "By setting read

size at twice the GOP size but less than the maximum
buffer size, system resources are conserved while
maintaining a high probability that a complete I-frame
is loaded to the read buffer".

The seek position is obtained (page 14, lines 21 to 28)
by first calculating a seek vector equal to the product
of the frames to be skipped (set at step 610) and the
average frame size (determined at step 600), and then
obtaining the seek position by means of the following
formula, wherein *Origin* is the current file pointer
position:
Seek_Position = Origin + Seek_vector - GOP_size/2.

According to the description, the adjustment by half of
the GOP size increases accuracy (page 14, lines 23
and 24).

3.   *Support by the application as originally filed*

3.1   In the decision under appeal, the Examining Division
        noted that original independent claim 1 specified the
        step of "providing statistical information" and
        original independent claim 20 recited "processing means
        for receiving statistical information". The original
        application disclosed only two ways of generating the
        statistical information, i.e. broadcasting of such
        information or generation of such information at the
        video recorder by statistical analysis during normal
        presentation of the stored multimedia programming. The
        independent claims on which the decision was based
        referred to "statistical information", without however
        specifying it further. There was no basis in the
        original application for such a general "statistical
        information".

That objection no longer applies because the current independent claims specify that statistical information is provided which includes an average GOP size and an average frame size. A basis for that feature can be found in the application as filed, for instance on page 11, lines 15 and 16.

3.2   The method of claim 1 corresponds to the method of making a special presentation in non-contiguous trick mode of Figure 6, which is described in the application as originally filed on page 11, line 13 to page 16.

More specifically, the MPEG stream stored on a hard disk is mentioned e.g. on page 6, lines 20 to 22, and on page 13, lines 26 to 30, and the non-contiguous trick mode is defined on page 11, lines 9 and 10. It is clear, for example from the title on page 1 of the description and original claim 1, that the invention is directed to making a special presentation of multimedia programming without prior indexing. The statistical information is described on page 11, line 13 to page 12, line 9, including Table 2.

Step 610 of receiving seek input indicating the special presentation to be made is disclosed in original claims 1 and 11 and on page 12, lines 10 and 11. The step of determining the read size and the further specification of that feature as step 630 of calculating the read size are disclosed on page 13, line 26, to page 14, line 5. In the Board's opinion, the skilled person understands that the "maximum buffer size" mentioned on page 14, lines 2 to 5, is intended to refer to the size of the read buffer, i.e. to the "read buffer size" now mentioned in the claims.

Steps 660 and 680 of, respectively, loading the portion
of stored multimedia and analysing the loaded portion
are described on page 15, lines 1 to 3 and on page 15,
line 26, to page 16, line 5; step 690 of forwarding the
loaded portion is disclosed on page 16, lines 13 to 14;
finally, step 640 of calculating a starting read or
seek position is disclosed on page 14, lines 21 to 26.

3.3   The features of the digital video recorder defined in
        independent claim 6 are shown in Figure 1 and described
        on page 5, line 9 to page 7, line 16. The read buffer
        is mentioned e.g. on page 8, lines 4 to 9, and on
        page 15, lines 1 to 3. The other features of claim 6
        are disclosed in the passages given above with regard
        to claim 1.

3.4   Dependent claims 2 to 5, 7 and 8 correspond to original
        claims 3, 6, 8, 15, 22 and 23, respectively. The
        features of dependent claims 7 and 8 are also disclosed
        in Figure 1.

3.5   The Board therefore concludes that the claims comply
        with Article 123(2) EPC.

4.   *Clarity and support by the description*

4.1   In the contested decision, the Examining Division
        raised clarity objections with regard to the features
        "maximum size of the read buffer", "product of the
        frames to be skipped and the average frame size" and
        "average group of picture size".

        The first two features, "maximum size of the read
        buffer" and "product of the frames to be skipped and
        the average frame size", are no longer recited in the

claims, so the corresponding objections no longer
apply.

The Examining Division considered the expression
"average group of picture size" to be unclear, because
the claim was ambiguous as to what qualified as
statistical information and did not specify on the
basis of which groups of pictures the average was
determined.

The appellant essentially argued that the term was
known in the art and that the application described two
possible ways of obtaining the value, either during
normal presentation or from pre-generated statistical
information referred to as "spoof" information in the
application.

In the Board's opinion, the skilled person understands
that the "average group of picture size" is an estimate
of the average size of GOPs in the digital multimedia
programming that could be determined in different ways.
That person also understands from the claims how that
estimate is used in the context of the claimed method.
The Board therefore does not agree with the Examining
Division's objection.

4.2   In its preliminary opinion, the Board expressed doubts
        with regard to clarity and support by the description
        of the features "where the special presentation is to
        be non-contiguous" and "adjusting the result by half of
        the average group of pictures (GOP) size".

        These objections have been overcome by amendment. In
        particular, the present independent claims additionally
        specify that the non-contiguous trick mode is a special
        presentation "in which programming data is loaded from

the hard disk non-contiguously". This definition is
clear and supported by the original description, see
page 11, lines 9 and 10. The definition of the
adjustment in the independent claims was also amended
to recite that the result is adjusted "by subtracting
half of the average group of picture (GOP) size", in
accordance with the description on page 14, lines 23
to 26.

4.3   The fact that the claim does not specify how the file
        pointer position is updated does not prejudice the
        clarity of the claim. The Board considers that the
        skilled person knows how to implement the current file
        pointer so that the method works correctly; a more
        detailed description of the feature "current file
        pointer position" is thus not necessary.

4.4   The Board has no other objections and is therefore
        satisfied that the claims satisfy the requirements of
        Article 84 EPC.

5.   *Inventive step*

5.1   In the decision under appeal and in the Board's
        preliminary opinion, document D1 was the starting point
        for assessing inventive step for the claimed invention.

        Document D1 discloses a method for retrieving I-frames
        for fast forward or reverse playback without previously
        known address information (Figure 3, pages 24 to 27).
        The method uses a sequence number I of the next I-frame
        to be displayed which is determined on the basis of the
        current playback mode, and a storage block counter K,
        which is used to identify the storage block to be read.
        After setting K to an initial block to be read, the
        value of K is set each time to an estimate

corresponding to the beginning of the next I-frame. The estimate is calculated from its previous value by adding or subtracting a constant M for forward or reverse playback respectively. The value of M "can be specified based on the compression ratio and the playback speed or it may be continuously adjusted based on the observed number of storage blocks separating the most recently-retrieved I-frames" (page 24, lines 1 to 20).

After retrieving the storage block identified by K, the method of document D1 examines the sequence to identify I-frames. If the loaded block does not have an I-frame, then an adjacent storage block is retrieved (page 24, line 21 to page 25, line 7). Once the beginning of the desired I-frame is found, the data is provided to the decoder for displaying.

In the Board's opinion, in document D1 a starting read or seek position is calculated on the basis of statistical information, namely the "observed number of storage blocks separating the most recently-retrieved I-frames". Adding M to K corresponds to "adding the calculated seek vector to the current file pointer position".

5.1.1   The method of claim 1 differs from that of document D1 essentially in that
(i)   the read size of the portion of the stored multimedia programming to be loaded is twice the average GOP size but less than the read buffer size;
(ii)   the seek vector is equal to the product of the number of frames to be skipped and the average frame size;

(iii) the result of adding the seek vector to the
      current file pointer position is adjusted by
      subtracting half the average GOP size.

5.2   As discussed at the oral proceedings, document D3 is
       also an adequate starting point and discloses
       feature (ii).

       Specifically, document D3 discloses a method for
       reproducing a trick play signal from an "encrypted
       video stream" or "conditional access video stream" of
       MPEG information stored in a storage device such as a
       hard disk (page 1, lines 1 to 16, page 3, line 28 to
       page 4, line 4, Figure 1). The method enables non-
       contiguous trick mode replay, for example fast forward
       at 2, 4, 8 or 16 times the normal rate, without
       previously indexing the stored video stream (page 2,
       lines 18 to 21, page 4, lines 14 to 19).

       In order to reproduce a video stream, the access
       controller of the system of document D3 supplies a
       series of segment starting addresses and segment length
       information to the storage device in order to retrieve
       the segments (page 4, lines 4 to 10). During trick
       play, the system of document D3 searches for the first
       occurring I-frame in each segment and outputs only that
       frame for display (page 4, lines 16 to 19). Document D3
       discloses on page 6, lines 28 and 29, that when a
       segment does not contain a complete I-frame, display of
       a previous I-frame may be repeated.

       The method of document D3 also calculates an average
       GOP size and an average frame length, the latter
       corresponding to the average frame size (page 5, line
       28 to page 6, line 8, page 7, lines 9 to 18).
       Document D3 discloses different ways to set the value

of the segment length. For example, that value can be
initially set to the average GOP size plus the maximum
I-frame size for fetching successive segments (page 6,
lines 1 to 8). It may also be adapted dynamically
during replay, using a feedback loop, so that on
average the number of I-frames in each data segment
equals a predetermined value such as 1.0 or 1.2
(page 4, line 33, to page 5, line 4, page 7, lines 19
to 30).

The distance between the starting addresses is adapted
to the stream and trick play speed, and is calculated
for example as the product of the distance in frames
and average frame length. The distance in frames equals
the trick play speed factor relative to the normal play
speed (page 6, line 32 to page 7, line 7). The method
of document D3 therefore also discloses calculating a
starting read or seek position by calculating a seek
vector in the same way as in the method of claim 1.

5.2.1   The subject-matter of claim 1 differs from the method
        of document D3 in that:
        (a) the read size is twice the average GOP size
             (a') but less than the read buffer size;
        (b) the result of adding the seek vector to the current
            file pointer position is adjusted by subtracting
            half the average GOP size.

5.3   The Board has no doubts that the claimed method in
        general, and the distinguishing features in particular,
        have technical character, since they contribute to the
        technical problem of retrieving from a stored MPEG
        stream a desired video frame, without knowledge of the
        storage area (address and length) in which the
        necessary stream data is stored.

5.4   The distinguishing features identified in the decision
        under appeal with regard to document D1 also included
        features (a), (a') and (b). According to the contested
        decision, the particular choice of the read size of the
        claimed invention, including feature (a), could not be
        regarded as being better than the read size of
        document D1. Whether the distinguishing features led to
        faster processing in the context of a special
        presentation depended on many factors not known from
        the claim (e.g. the variation of the GOP sizes).

        In the grounds of appeal the appellant argued that
        there was no requirement in the EPC that an invention
        should be better or have an advantage. The obviousness
        argument was based on ex post facto analysis.

        Although the Board tends to agree with the Examining
        Division that faster processing of a special
        presentation is not achieved by the distinguishing
        features in all cases, some arguments of the contested
        decision are not convincing. In particular, it is in
        principle sufficient that the effect of the invention
        is achievable for an identifiable class of cases and,
        as argued by the appellant, there is no requirement in
        the EPC that an invention be better or advantageous.
        Whether generating the statistical information involves
        as much overhead as creating an index is not directly
        relevant to the question of efficiency or inventive
        step, because the statistical information could be
        created once and used several times and, anyway, the
        problem solved by the distinguishing technical features
        could be seen as finding an alternative solution.

5.5   In line with the decision under appeal, the Board finds
        obvious that the data read from disk should not exceed
        the read buffer size, as recited in feature (a').

5.6   In its reply to the Board's preliminary opinion and at the oral proceedings, the appellant argued that all three factors used to determine which portion of data to read - read size, seek vector, and adjustment - contributed to obtaining a target I-frame to be displayed. Setting all three on the basis of the average GOP size brought additional advantages of maintaining accuracy across different average GOP sizes. In practice, half the time the portion of programming being processed had a size shorter, and half the time longer, than the average GOP size. Where it had a shorter-than-average GOP size, the pointer position would overshoot the actual position of the target I-frame. Thus, at least half the time, the methods known from the prior art would initially miss the target I-frame, requiring more data to be read to find it, or else degrading the playback quality of the trick mode.

The technical problem named by the appellant presumes that the method of the invention intends to retrieve a particular I-frame, the "target I-frame". The description of the present application explains on page 14, lines 23 and 24, that the purpose of the adjustment is to increase accuracy, and discloses on page 12, lines 10 to 20, that the system determines the number of frames to skip for the particular special presentation chosen by the user. The Board finds that the purpose of obtaining a target I-frame can be derived from those passages, where the target I-frame is the particular I-frame to be retrieved such that a specific number of frames is skipped.

The Board therefore recognises at least in part the effect mentioned by the appellant insofar as it

acknowledges that feature (a) contributes to obtaining a complete I-frame and feature (b) increases accuracy of the seek to a target I-frame.

5.7   With regard to feature (b), the Examining Division argued that it was common practice to apply an adjustment when seeking to a new position in magnetic and optical disc devices, in order to prevent an overshoot and sequential backward seek operation. The Board however is not convinced that it was obvious to apply that idea in the present case. Such adjustments are commonly used to compensate for inaccuracy due to user reaction time or due to lack of precision of the hardware, but those contexts are remote from the present one. In the present case, the MPEG stream is stored on a disk, the exact position is unknown and there is no sequential backward seek operation. It is therefore not obvious to apply such an adjustment in the present different context.

The Board is not convinced that, without further hints, the skilled person would consider solving the problem stated above by subtracting half the GOP size to adjust the file position (b). None of the cited prior-art documents discloses or suggests feature (b).

Since the Board is convinced that feature (b) is inventive, it does not have to decide whether features (a) and (b) interact to achieve a combined effect, as argued by the appellant.

5.8   Features (a), (a') and (b) correspond to features (i) and (iii), distinguishing the subject-matter of claim 1 from the method of document D1. Starting inventive-step assessment from document D1 will therefore lead to the same conclusion as that reached for document D3.

5.9   The Board is therefore satisfied that the subject-matter of claim 1, and of corresponding independent claim 6, is inventive over the cited prior art within the meaning of Article 56 EPC. Since the subject-matter of the dependent claims includes all the features of the corresponding independent claims, their subject-matter is also inventive.

6.   *Conclusion*

        From the above, the Board concludes that the claims comply with Articles 84, 123(2), 52(1) and 56 EPC. The description has been adapted to the present claims. No other deficiencies can be identified with regard to the application documents on file. The case is therefore to be remitted to the department of first instance with the order to grant a patent.

Order

For these reasons it is decided that:

1.   The decision under appeal is set aside.

2.   The case is remitted to the department of first
        instance with the order to grant a patent on the basis
        of the following documents:
        -   claims 1 to 8 of the sole request as filed in the
            oral proceedings in appeal;
        -   description pages 1, 2 and 5 to 16 as published
            and 3, 4, 4A and 4B as filed in the oral
            proceedings in appeal;
        -   drawings sheets 1/6 to 6/6 as published.

The Registrar: The Chairman:

I. Aperribay   R. Moufang

Decision electronically authenticated